

Stillman (C. F.)

A RATIONAL BRACE

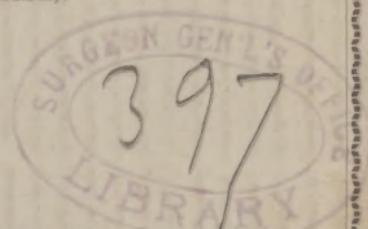
FOR THE TREATMENT

OF

Caries *of the* Vertebrae

(POTTS' DISEASE).

BY



CHARLES F. STILLMAN, M. Sc., M. D.,
OF CHICAGO.

(Member of American Orthopædic Association.)

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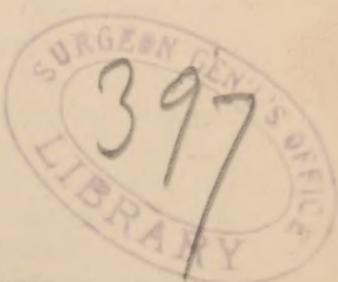
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*A RATIONAL BRACE FOR THE TREATMENT OF
CARIES OF THE VERTEBRÆ
(POTTS' DISEASE).*

BY CHARLES F. STILLMAN, M. Sc., M. D., of Chicago.
(Member American Orthopædic Association.)

In studying the mechanical problem involved in the treatment of spondylitis, there are two factors which must be recognized:

1. Arrest of the disease.
2. Reduction of the deformity.

Nature points out the direction in which force should be applied to produce curative results. Who has not noticed the position assumed by a patient with caries of the spine? The body is held rigidly erect, the head and shoulders are thrown back, and in stooping to pick an object from the floor, this position is still maintained, the patient having every muscle exercised to hold the spine perfectly fixed and bent backward, the position being similar to that of an equestrian.

Were it possible for this position to be maintained continuously, progress of the disease to the stage of deformity would be almost impossible; but it is a natural tendency for the patient to bend forward, and the act of bending forward removes the superincumbent weight from the articular processes, and proportion-

ately transfers it to the bodies of the vertebrae and their intervening cartilages. The muscles are unable to continue supporting the spine in the hyper-erect position at all times, and as a natural consequence of the occasional bending forward, increased pressure is exerted upon the diseased vertebral bodies and a hastened absorption of their structure, resulting in the formation of deformity, ensues.

Nature's indication for the treatment of Potts' disease is to put a splint on the back of the patient which

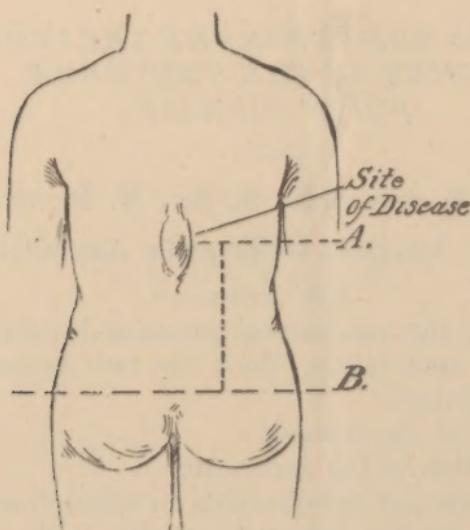


FIG. 1. Showing appearance of kyphos in spinal caries.

will maintain this erect position, for, since the tendency of the disease is to curve the affected portion of the spine forward, the center of this curve being anteriorly, the corrective force should be applied to produce exactly an opposite curve to that of the diseased condition, the center of such a corrective curve being posterior to the column. In other words, we must follow Nature's lead and hold the spine erect and slightly curved backward, the tendency of the disease being to bend it forward. If this position could be

maintained indefinitely without mechanical support, there would be rapid improvement; but, as this is obviously impossible, we attempt to embody the forces involved into a brace constructed in two parts. The *first* portion of the brace, forming the short arm of the lever, consists of a firm pelvic band, from which two strong strips pass upward, and terminate in two pivoted oblong pads, one on either side of the protruding spinous processes of the diseased vertebrae, and press-

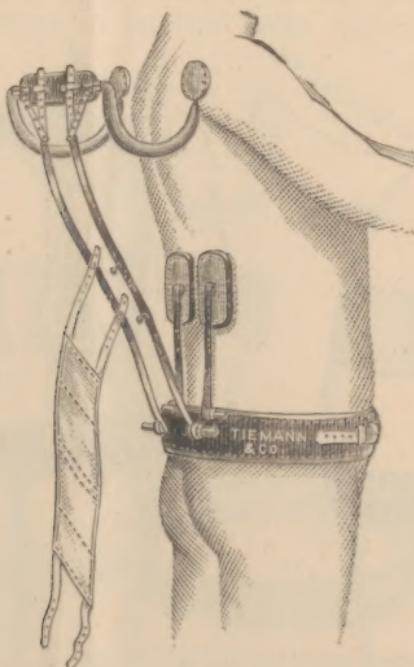


FIG. 2. Stillman's brace for lower dorsal region partially applied, lying over the transverse processes. These are placed just sufficiently far apart not to impinge upon the spinous processes, and thus the excoriation so often produced by plaster and leather *jackets* is entirely avoided.

The *second* portion of the brace, equivalent to the long arm of the lever, consists of a back frame, extending from the lower portion of the sacrum upward to the first dorsal vertebra; and is secured to the pelvic

girth by ratchets or clamps which allow it to be adjusted at any angle, and thus regulate the amount of forward pressure upon the kyphos.

The angle at which this back frame or long arm of the lever is set out from the body (see Fig. 2) determines whether the brace shall act as a lever brace or as a simple fixation brace. If adjusted as shown in Fig. 2, and secured to the body (as in Figs. 3 and 4) this brace forms a V-shaped spring lever which produces backward extension of the bodies of the verte-



FIG. 3. The same applied.

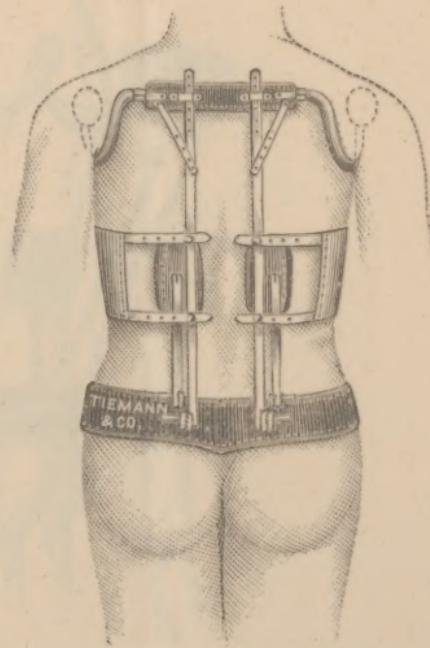


FIG. 4. The same—rear view.

brae, and thus tends to arrest the disease and improve the deformity, while it maintains the spine firmly in the erect position at the same time.

There are other features of this brace which deserve mention. It will be observed that, if the angle between the short and long arms of the lever is considerable, when the long arm is fastened firmly to the body, the bending forward tendency of the upper part of the trunk does not cause the spine to give way at the seat

of disease; for, in proportion as the patient leans forward, the short arms press forward upon the kyphos and oppose a resistance to the bending at that point, so that by the brace a curative automatic effect is maintained to keep the body erect and at the same time prevent further deformity, while tending to improve that which already exists. Furthermore, the *spring* effect produced by the setting off of the traction-frame and drawing it forward against the body, which is thus held erect when properly strapped, causes the brace to be held more tightly against the

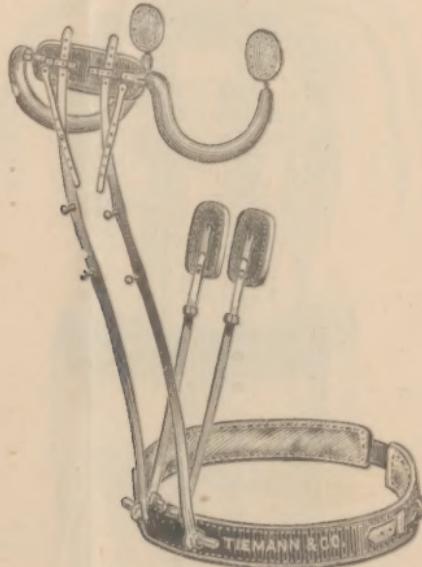


FIG. 5. Brace for middle dorsal region.

back, and insures a higher degree of fixation than any other form of apparatus in use. In the beginning of the treatment it is well to have the traction-frame set off at such an angle as to cause considerable pressure upon the transverse processes of the vertebrae, and insure thorough extension of the diseased portion. But this angle may be lessened week by week as the case improves, until finally the traction-frame lies directly upon the pads, and the brace becomes a mere fixation brace, without any leverage whatever. To further illustrate the action of the brace, if a bent lead strip is

taken, and one extremity held firmly by one hand with the thumb pressed against the knuckle, it will be found that a force comparatively slight (when contrasted with that used in linear traction to produce a less perfect result) with the other hand will serve to straighten the rod into its original position.

This is precisely what is accomplished by this brace. We grasp firmly the lower part of the spine as high as the seat of disease, and then, by force applied above,

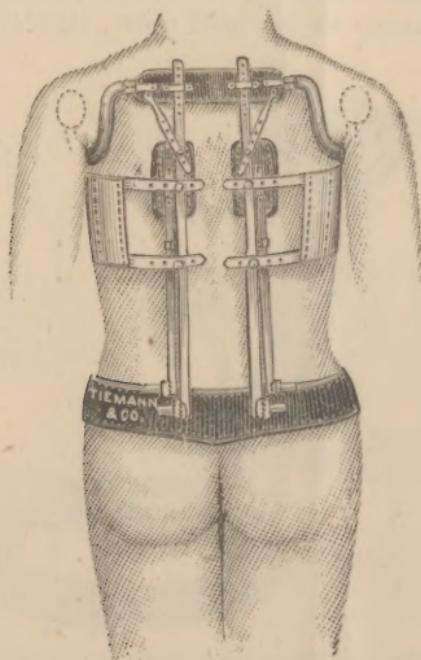


FIG. 6. Brace for upper dorsal region (applied).

bend the spine backward sufficiently to relieve the bodies of the vertebrae from pressure, and at the same time with the short arm of the lever (corresponding to the action of the thumb upon the lead strip), press forward upon the deformity, and thus, by the use of a very light frame-work, we can exert sufficient leverage to retain the spine in an erect posture; and, as this *backward* force is distributed along the entire dorsal and lumbar spine, while the *forward* is exerted only along the spine from the seat of disease down-

ward, decreasing from the kyphos to the sacrum, it will be found that no injurious pressure is exerted at any one point. For the *middle dorsal region* the short arms of the lever are longer than for the lower dorsal, so as to be opposite the seat of disease, as in Fig. 5. For the *upper dorsal region* the short arms pass to the seat of disease, making a very effective brace for this region (see Fig. 6) which is generally considered to be the part of the spine least amenable to mechanical

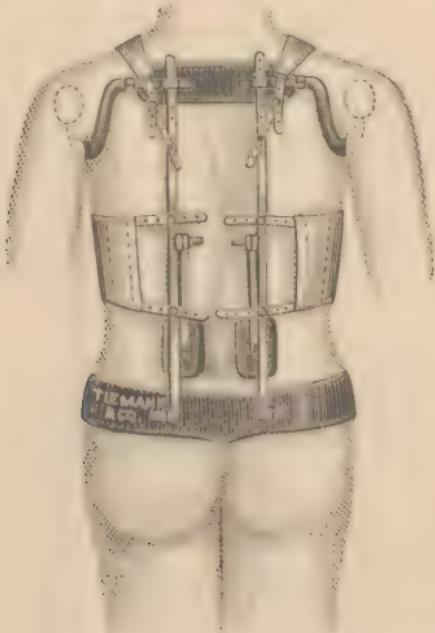


FIG. 7. Brace for caries of the lower lumbar vertebrae applied. treatment. For the *cervical region*, or for caries of the first and second vertebrae, the brace shown in Fig. 6 should have added to it a jury mast or a head piece, which is provided with facilities for fixing the head firmly in any desired position, by the insertion in the neck strip connecting the head piece with the rest of the brace, of three clamps which are so placed as to secure this result. The choice between the jury mast and fixed head piece in these cervical cases is usually one which the surgeon is called upon to decide for himself, and is to some extent regulated by the gravity

of the condition, the latter being more effective in caries which is proceeding very rapidly in its course.* When the disease is situated in the lumbar or in some cases in the lower dorsal region, and the short arms of the lever are too short to exert sufficient forward pressure upon the kyphos, the lever is reversed, the point of intersection of the long and short arms being placed in the dorsal region instead of over the sacrum. From this the short arm lever strips pass down on either side of the spine to the seat of disease where they terminate in pads, and the long arm of the lever passes to the sacrum, there terminating in the pelvic girth.

Advantages of braces constructed on the V principle:

I. They hold the spine rigidly in the erect position and at the same time bring automatic spring pressure to bear at the seat of disease, thus producing the very best conditions for rapid and complete recovery.

II. They are removable at pleasure, and can be worn over an undershirt, so that absolute cleanliness can be secured.

III. The power is adjustable, so that changes can be made during the different stages of the disease without the necessity of purchasing other apparatus.

IV. They can be worn with perfect ease and comfort.

V. Those provided with acromial pads do not in the least impede respiration, but rather tend to increase its capacity by holding the shoulders back.

VI. By their combined backward traction and forward pressure, they retain the spinal column in a condition of absolute rest, and at the same time relieve the diseased parts from the pressure of the superincumbent weight, and reduce deformity.

The principle upon which these braces are constructed is a new one in orthopedic surgery, and is original with the writer, and its range of utility is not confined to caries of the spine but extends to many other deformities.

* For such cases, the constant use of the recumbent spinal extension frame is recommended. (See *Western Medical Reporter*, February, 1890.)

